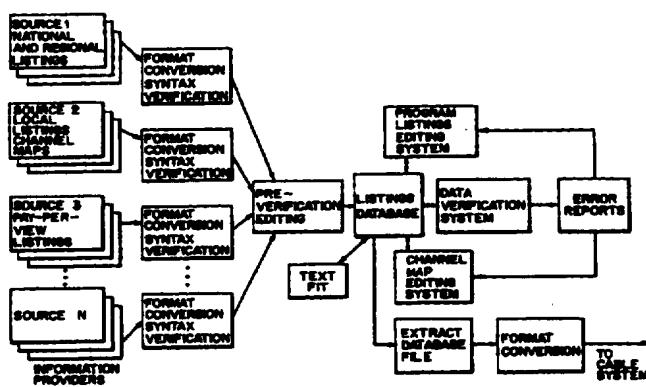




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(54) Title: **SYSTEM AND METHOD FOR VERIFICATION OF ELECTRONIC TELEVISION PROGRAM GUIDE DATA**



**(57) Abstract**

The system and method of the present invention provides for automated checking of the program listings data in a database of television program schedule listings used in an electronic program guide ("EPG"). The disclosed invention provides a system and method for verification of the EPG data prior to transmission to a cable or other pay television system (or prior to transmission to viewers). The verification system may be used to check the entire database or a user-defined subset of the database for one or more of the following: missing stations, schedule gaps and overlaps, missing titles, missing copy, missing fields, missing movies ratings, lengthy titles, lengthy copy, editorial errors, and inappropriate language. In this manner, the EPG provider ensures the integrity of the EPG data and substantially reduces the time required to manually check all of the data in the program listings database. The verification system may be easily integrated with other processing steps performed on the EPG data prior to being transmitted to cable and multi-system operators.

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**SYSTEM AND METHOD FOR VERIFICATION OF  
ELECTRONIC TELEVISION PROGRAM GUIDE DATA**

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**Background of the Invention**

This invention relates to an electronic program guide ("EPG") system that provides users with schedule information for broadcast or cablecast programs 10 available for viewing on a video display. More particularly, it relates to a system and method for verification of the EPG data prior to transmission to a plurality of remote locations such as cable system head ends or viewer sites.

Electronic program guides for television systems are known in the art, particularly with regard to cable television systems. For example, one common 15 implementation of a electronic program guide utilizes a dedicated cable television channel for continuously broadcasting program schedule information. The advantage of such a system is that it is relatively easy to deploy because it is centrally implemented at the cable head-end. No additional electronics or software are required at the viewer location because full control of the display is maintained at the cable 20 head-end. The display information is then broadcast continuously on a dedicated cable channel. The television viewer simply tunes the cable converter box or television tuner to the channel on which the schedule information is modulated and views the program listings. Typically, these program guides utilize a scrolling display of television 25 listings or a fixed display that periodically changes. Some systems employ a partial screen of listings with additional information in the remainder of the screen such as advertisements for movies on pay channels, pay-per-view (PPV) event schedules, time and weather information, and other commercial information. These systems generally incorporate a grid or matrix to display the program schedule information, with a different row for each channel and columns representing different time slots.

30 In addition, interactive program guides are also known. Such guides permit the user to select the program listings to be displayed based on user selection criteria and display the listings on the television receiver in a desired format. Interactive guides are more versatile than dedicated channel guides because they operate under user control. However, they are more costly to implement because they 35 require memory and processor capabilities at each user site. The present invention may be used with either dedicated channel or interactive program guides because it operates on the program listings data common to both types of guides.

Modern cable systems include upwards of 100 channels. Thus, for both dedicated channel and interactive program EPGs, large quantities of data are required to provide a complete listing of program schedule information. A problem common to both types of systems is that there are often errors in the data that must be corrected.

- 5 Errors may arise for any number of reasons. First, it is common for a complete database of program listings to be compiled from several different sources. Much of the data is available on a national basis, including network schedules (both broadcast and cable), pay-per-view listings, and regional programming. Some data, however, must be obtained at a local level, including locally originated programs, channel maps
- 10 for individual cable systems, and pricing for pay-per-view programs. The fact that there is no single entity responsible for compilation of the entire listings database increases the risk of errors. For example, a portion of the data may need to be converted to a different format before it can be utilized in the program guide.

Second, the listings database contains an enormous amount of data.

- 15 Electronic program guides, whether of the dedicated channel or interactive variety, include a database comprising the program listings information for the various stations and pay-per-view channels. The listings data may be arranged in weekly blocks or other time periods. As an example, consider a cable system with eighty (80) channels, each one broadcasting 24 hours a day. Assuming for each station a daily average of
- 20 four hours of two-hour programs, five hours of on-hour programs, and the balance comprising one-half hour programs, 37 different programs are aired per channel per day. Thus, a one week database comprises on average information for  $37 \times 80 \times 7 = 20,720$  programs. Although many programs repeat on a daily basis, it is apparent that even one weeks' worth of program listings for the average cable system is a very large
- 25 amount of data. In addition, while much of the data may be compiled in advance, a substantial number of listings must be added, and schedule changes accounted for, shortly before the data is transmitted to the various cable systems. The volume of data makes it difficult and time consuming to manually ensure its reliability.

- 30 Finally, certain programs, primarily sports events, are not scheduled as far in advance as other programs. For example, although a time slot may be slated for a baseball game, it may not be known until one week or less in advance of the scheduled game, the particular game to be broadcast. There is thus a need to

efficiently and quickly identify entries in a listings database that require editing of one form or another either to add information or correct errors.

A program listings database with incorrect listings or incomplete information is of limited utility. There is thus a need to ensure the reliability of the data transmitted to the cable systems and ultimately to viewers. However, because the volume of data is so great, there is a need for an automated procedure for verification of the data to reduce the number of manual hours required. There is thus a need for an automated system and method of reviewing the EPG data and flagging any errors therein. In addition, there is a need to provide a list of any such errors to a database editor to permit the editor to take whatever corrective action is necessary. In addition, different data may need to be generated for different cable systems because, e.g., each cable system may have different local programming or pay-per-view programs or schedules.

One factor that complicates the task is the need for a program listings database to be compatible with a plurality of different platforms. Different cable systems may have different hardware configurations at the cable system head-end and different set-top converter boxes at the viewer locations. For example, EPGs typically display program listings in grid format with columns representing different time slots and rows representing different channels. Set-top converters vary with regard to their text display capabilities. Some may display text using a proportional font while others use a standard font. In addition, some are configured to display symbols in the grid cells in addition to text which decreases the available space for text display. Thus, the database must be configured in such a way to accommodate the varying capabilities of set-top converters. One way to accomplish this is by editing the text (program titles, copy, station identifications, and any other text included in the EPG) to abbreviate any text that does not fit into a particular grid cell. A system for assisting in this "text fit" process is described in co-pending application serial number 08/247,059. Thus, when verifying the data prior to transmission to a cable system, it is necessary to specify the platform on which the EPG operates so as to determine if the listings are properly edited for the particular platform.

The system and method of the present invention provides for automated checking of the program listings data in the database. The disclosed invention solves these and other problems of prior art EPG systems by providing a system and method

for verification of the EPG data prior to transmission to a cable or other pay television system (or prior to transmission to viewers). Prior to being processed by the data verification system of the present invention, the database of television program schedule listings may undergo initial processing as follows. First, the data is collected

5 from the various information providers and checked for high level errors. Next, it may be required to normalize the data to the EPG database structure and format as it is possible that the information collected from the different sources uses different formats and syntax. Finally, the data may be processed with a text fit system to determine if any titles in the database require editing in order to fit within a grid cell of a

10 predetermined size for any of the different platforms on which the EPG will operate. Alternatively, the text fit process may be incorporated as part of the listing verification process so that text requiring editing to fit within a particular grid cell size is identified and presented to the user for editing if not already included in a library or look-up table of pre-edited text.

15 At this stage, the listing verification system and procedure of the present invention operates on the data to check for any errors in the data. In particular, checks may be run for any missing stations, schedule gaps, schedule overlaps, missing titles, missing copy, missing fields (i.e., run time, slot time, program type), missing movie ratings, missing program origin, missing PPV price, PPV events on non-PPV station,

20 non-PPV event on PPV station, inappropriate language, lengthy titles, lengthy copy, and editorial errors. "Lengthy" as used herein refers to text that is too long to fit into the allocated grid space in the program guide. Errors are automatically written to output files and separate files are used for each of the above parameters.

25 The database may also be processed by additional steps such as a program listings editing system to create, delete, or modify individual program listings and a channel map editing system to create, delete, or modify individual channel maps, which contain information identifying the stations carried by a cable system as well as the on-air times for each station. The program listings may be searched using the program title, program identification number (PIN), or station name. It is preferable

30 to perform these editing steps prior to listing verification and text fit to ensure that all of the data in the data file has been processed by these latter two steps. Alternatively, the listing verification process may be re-run if any editing is performed after initial verification of the data. Finally, an extract process is run against the database to create

data files containing cable system specific data based on a specified date range and channel map. The data files may be ASCII or tightly packed binary files readable by the cable system to which it is destined. Finally, the data is processed according to the specific platform and transmitted to the designated cable system. Cable system as used herein is not limited to standard cable television systems but includes direct broadcast television systems, over-the-air pay television systems, and any other television program distribution system including central control over the distribution of a television signals for a plurality of stations.

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#### Brief Description of the Drawings

Fig. 1 is a block diagram showing an EPG delivery system including the data verification system of the invention herein.

Fig. 2 is a flow chart illustrating the overall operation of the data verification system of the invention herein.

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Fig. 3 is a flow chart showing the operation of the schedule gaps and overlaps verification step of one embodiment of the data verification system of the invention herein.

Fig. 4 is an illustration of a user interface for setting the parameters of one embodiment of the data verification system of the invention herein.

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Fig. 5 is an illustration of a post-verification correction menu of one embodiment of the data verification system of the invention herein.

Fig. 6 is illustration of the correction editor feature of one embodiment of the data verification system of the invention herein.

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#### DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

##### System Configuration

Fig. 1 is a block diagram illustrating schematically the general configuration for one embodiment of an electronic program guide delivery system. Information for the database may originate from several different information providers. For example, one source may provide all the national listings which may include network (both broadcast and cable) schedules, and regional program schedules or, alternatively, there may be multiple sources of such information. A single second source (or combination of second sources) may provide local listings information which

includes schedules for locally originated programs, channel maps for individual cable systems, and information on shared channels (single cable channels that carry different programming during different parts of the day). A third information provider (or multiple providers) may furnish all of the listings information for pay-per-view events.

- 5 It may even be the case that each of these categories of program schedule information are provided by multiple sources. Of course, it is also possible that all the information be gathered and provided by a single source or that overlapping information be gathered from the multiple sources. In addition, there may be other information providers such as billing vendors that furnish billing information.
- 10 Due to the fact that the listings database is likely to be comprised of information from a variety of different sources which may or may not furnish the data in the desired format, it may be necessary to perform format conversion and/or syntax verification on the received data prior to loading it into the database. This step is necessary to ensure that the data is in a uniform format in the database for further
- 15 processing. A second function which may be performed on the data is pre-verification editing. One example of such editing is processing of the data by the text fit system disclosed in co-pending application serial number 247,059. Text fit processing in effect expands the database to include multiple values for text fields for individual listings to accommodate different EPG platforms. For example, varying amounts of
- 20 space are allocated for program titles for the different platforms. In addition, within the same platform, multiple versions of a title may be required to fit inside grid cells of, e.g., for a two hour program, 30, 60, 90, and 120 minutes. The text fit system determines whether an edited version of a title is required to fit within the designated space for a particular platform and grid cell. The database is then edited to include an
- 25 abbreviated version of the title as well as the full title for the listing. It is also possible that a portion of the data will already contain multiple versions of titles. In some cases, it may be desirable to incorporate the text fit process into the verification utility by using the verification utility to first identify listings requiring processing with the text fit system and then running the text fit system on these identified listings.
- 30 Depending on the particular implementation of the EPG delivery system, it may be desirable or necessary to perform additional pre-verification processing on the data.

Following the pre-verification processing steps, the listings database is assembled and processed by the data verification system. As shown in Fig. 1, the data

verification system operates on the listings database and generates error reports for errors found therein. The program listings and channel map editing systems are used to make changes to the data in the listings database. The data verification system operates under user control to determine which data fields are to be checked.

- 5    Alternatively, the system can operate fully automatically to check all data fields. An advantageous feature of one embodiment of the present invention is the creation of reports for each type of error. The reports permit the editor to reconcile any missing or conflicting information in the database with the information provider. The reports may be electronically generated and then viewed on a computer, stored in electronic
- 10   format, or printed as hard copies. The utility operates on the database of program listings information for a user definable time period, such as one week. For each verification utility, stations may be selected individually, by channel map, platform type, multi-system operator ("MSO"), or arbitrary grouping. Each of the processing options associated with the system is discussed below. The operation of the various
- 15   options is discussed under the section headed "System Operation."

#### 1.    Missing Stations

In order to determine if there are any stations missing from the database, the listings database (or any subset thereof) is checked against a second database that

- 20   includes a list of all stations that should be included in the listings database or subset, such as a station list file for a particular cable system. The missing stations verification utility then outputs to a file a list of the missing stations.

#### 2.    Schedule Gaps and Overlaps

It is important to ensure that there are no gaps in the programming schedule. Included in the database is an indication of the daily on-the-air periods for each station. The database is then checked to determine if, for any designated station, there are any gaps between the ending time of a program and the start time of the next program. The end times for listings are calculated by adding the program's slot time (total time until the beginning of the next listing) to the start time. The system provides the flexibility of being able to specify any time range for checking for gaps and overlaps. If the beginning of the time range for a channel does not coincide with the beginning of a program, the system will check for the "intersecting listing", i.e., the listing starting prior to and ending after the beginning of the specified time range.

Schedule holes are written to a file that includes the date, station, start time, and end time of the hole or other information sufficient to uniquely identify the schedule hole.

This option also checks for overlaps in a similar manner. If the listings

5 data indicates that a program on a particular channel begins prior to the sum of the start time plus the run time of the previous program, the listing is flagged as a program overlap error.

### 3. Missing Titles

The listings database is checked for missing titles for program events, 10 i.e., where the listing has no title field. Listings with missing titles are written to a file that includes the date, station, and start time of the listing.

### 4. Missing Copy

Certain program listings include additional descriptive information in addition to the program title called "copy." These include movies, live sports, and 15 pay-per-view programs. The additional information may also be provided for other programs as well as determined by the operating rules for the EPG. The missing copy option checks these listings for missing copy and writes any such listings to a file with sufficient context data to identify the program, such as program date, station, start time, and title.

### 20 5. Missing Fields

This option checks the database listings to ensure that all required fields for each type of program are present. For example, according to the operating rules of the EPG as defined by the EPG provider, the schedule information for pay-per-view and premium movies must include an MPAA rating as this parameter may be used by 25 viewers to lock-out certain movies. Thus, the missing fields option will check that the MPAA rating, as well as the other fields dictated by the operating rules, are in the database for the pay-per-view and premium listings. For PPV events, the operating rules may further dictate that the schedule information include price information, a telephone number for ordering the event, and promotional copy used for advertising 30 the event. The missing fields option would then check these fields as well for programs designated as PPV events. Similarly, the operating rules may dictate different required fields for other types of listings. Listings with missing fields are

written to a file including the date, station, and start time of the program, as well as an identification of the missing field.

#### 6. Missing Movie Ratings

The listings database includes the MPAA movie ratings for movies to be shown on premium and PPV channels. Any such movies with missing ratings are written to a file including the date, station, start time, and title of the movie.

#### 7. Lengthy Titles

Some or all of the data in the database may have already been processed with the text fit system to provide multiple titles where required to fit into the grid cells. The lengthy titles option permits the user to perform an additional check for any titles that do not fit into the maximum allowable space for each of the selected platforms and also identifies those entries not yet processed with the text fit system. Any such titles found are written to a file including the platform, date, station, start time, and title of the listings. This option may be selected for any of the platforms on which the EPG operates. The titles may then be processed using text fit and the verification utility re-run on the database.

#### 8. Lengthy Copy

This option is similar to the lengthy copy option and searches the listings database for the copy for movies, live sports, pay-per-view programs, and any other entries with copy that will not fit into the allowable space for the selected platforms. Any such listings found are written to a file including the platform, date, station, start time, and title of the listings.

#### 9. Editorial Errors

The listings database is searched for editorial errors which can include, inter alia, duplicated titles or years in the copy of a movie, cross references to other days, and certain phrases such as "at press time." Editorial errors are written to a file including the date, station, start time, and description of the error found for each listing. Of course, these particular errors represent only one particular embodiment of the system designed to detect the most common types of errors -- the utility may readily be modified to detect any specified editorial errors.

#### 10. Language

This option searches the listings database for inappropriate language in titles, copy, and messages. The listings database is checked against a language

dictionary that includes all of the language deemed inappropriate. Listings with any such language are written to a file including the date, station, start time, and inappropriate language found.

#### 11. Other Verification Options

5        The above options for verifying the data in the listings database are not exhaustive. The verification system may be readily configured to check any field in the database. Some of the other fields which may be checked are as follows: missing program type, missing slot time, missing run time, missing program origin, PPV event on a non-PPV station, non-PPV event on a PPV station, and missing price or  
10      promotional copy for PPV events. Program type refers to the type of broadcast, i.e., broadcast, PPV, near video on demand ("NVOD"), etc. The slot time of a program is the total time from the beginning of one program until the start of the next program, including commercial time, and program run time is the actual running time of the program itself. The slot time for a program must exceed (or be only slightly less than)  
15      its run time, which is another possible verification option. Program origin indicates the source of the program. The program type and station type are used to check whether a PPV event is scheduled on a non-PPV station and whether a non-PPV event is scheduled on a PPV station.

It will be recognized by those of skill in the art that the particular  
20      information written to the appropriate file when an error or omission is located is not critical. All that is necessary is that sufficient context data is supplied to uniquely identify the faulty listing for correction purposes.

The data verification system may also be configured with an error navigation feature as follows. Following processing of the database or designated  
25      subset thereof and generation of the various error reports, the system may be configured to return to the portions of the database identified as containing errors, retrieve the appropriate database entries, and present them to the user for correction. Following correction of the errors, the database may again be processed with the data verification utility to check for errors. In this manner, an iterative process may be  
30      implemented to correct and verify all of the data in the database.

System Operation

The data verification utility operates as shown in the flow diagram of Fig. 2. First the user is queried to specify the platform or platforms and the channel maps for which the utility is to be run. Alternatively, with a database such as that described in Tables 1 and 2, the user need only specify the cable group, system, or head end. The verification system can then extract from the database the appropriate platform(s) and channel map(s). Next, the desired verification options are chosen. Alternatively, the user may elect to activate all verification options. Depending on the options selected, the user may be queried for additional information. If the "Check Lengthy Titles" or "Check Lengthy Copy" option is selected, the user must input the path and filename for a font library file in order to determine the proper font to be used for display of the text. If the selection of a platform uniquely determines the font, this step may be eliminated as the file may be selected automatically. The particular font chosen affects the space required to display the text. Of course, the user may be supplied with a list of possible files and need only select a file from the displayed list. If the "Check Missing Stations" option is selected, the user will be requested to enter a master list of all stations that should appear in the listings database or a subset of stations representing the list for a particular cable system. This information may be contained in a station list file. If the "Check Language" option is selected, the user enters a language dictionary file containing a library of inappropriate words. Finally, the user is queried to enter a path and filenames for the output verification reports. Of course, a default path and filename may be used. Separate verification reports are generated for each selected option. The user may also elect to combine chosen reports into a single report.

Alternatively, to minimize the amount of user interaction required, the database may be configured to define all the necessary parameters so that the user need only select the cable system and verification options. For each cable system (or cable group or head end), the database contains a table with the correct platform(s) and a table listing the different fonts available for use with the platforms so that the user need not designate the font library file. Similarly, the language dictionary file may be defined by the choice of platform, eliminating the need for the user to define the file.

Following input of all the requested information, the data verification utility displays the selected options and user entered parameters for confirmation by the

user. The data verification process then begins. Following processing, the system displays to the user a summary report showing the cumulative total errors located for each of the selected options. In addition, output reports are generated for each of the options selected including all listings found with the indicated error or omission.

5 Table 1 is an alphabetical list of all the data fields in one embodiment of a relational database for television program listings. The table shows the format, size, and data range for each field. Not every data field is used for each database entry. For example, fields such as `actor_name`, `mpaa_rating`, `mpaa_ra_description`, `mpaa_reason`, `mpaa_reason_code`, `star-rating`, and `year` will generally be used only for  
 10 movies. Those of ordinary skill in the art will recognize that the disclosed data verification utility may be designed to operate with any database configuration. Table 2 illustrates the structure of the relational database of Fig. 1 showing how the various database fields are organized as well as the primary keys (pk) and foreign keys. The bold typeface indicates the name of a table in the database and the entries listed  
 15 underneath are the fields that comprise the table.

Table 1

	Element	Definition	Referenced By
20	<code>actor_name</code>	= \ name of actor \ type VARCHAR2 (64)	<code>Movie_Credits</code>
25	<code>available_until</code>	= \ date & time YCTV program ends \ type DATE	<code>Schedule</code>
30	<code>barker_description</code>	= \ text describing 'barker_type' \ type VARCHAR2 (32)	<code>Barker_Type</code>
35	<code>barker_type</code>	= \ video barker type \ type NUMBER (4, 0) \ range { 0 ... 5 }	<code>Barker_Type</code> <code>Instance_Time</code> <code>Channel_Map</code>
40	<code>billing</code>	= \ actor credit ranking \ type NUMBER (2, 0)	<code>Movie_Credits</code>
	<code>category</code>	= \ program category \ type VARCHAR2 (16) \ unique	<code>Category</code> <code>Program</code>
	<code>channel_number</code>	= \ headend channel number \ type NUMBER (7, 0)	<code>Channel_Map</code> <code>Instance_Time</code>

	range { 0 ... 9,999,999 }	Channel_Map_PPV
5	channel_label = \ parallel channel station label \ type VARCHAR2 (16) \ Channel_Map_PPV	Channel_Map_Instance_Time
10	character = \ 8 bit ASCII character \ type NUMBER (3, 0) \ range { 0 ... 255 }	Pixel_Map
15	characters_field_width = (characters) \ Platform_Field type NUMBER (4, 0) range { 1 ... 9,999 }	\ platform field width
20	closed_caption = \ closed captioning indicator \ type NUMBER (5, 0) [BOOLEAN] range { YES   NO }	Schedule
25	color_class = \ color state of movie \ type VARCHAR2 (16) range { 'BW'   'Color'   'Colorized' }	Color_Class Schedule
30	company_address = \ cable company address \ type VARCHAR2 (512)	Cable_Company
35	company_id = \ cable system company identifier \ type NUMBER (8, 0) range { 1 ... 99,999,999 }	Cable_Company Company_Contact MSO_Company
40	company_logo = \ cable company logo \ type VARCHAR2 (512)	Cable_Company
45	company_name = \ cable company description \ type VARCHAR2 (512)	Cable_Company
	company_owner = \ cable company name \ type VARCHAR2 (128)	Cable_Company
	contact_email = \ contact electronic mail address \ type VARCHAR2 (64)	MSO_Contact Company_Contact
	contact_fax = \ contact fax phone number \ type VARCHAR2 (16)	MSO_Contact Company_Contact
	contact_name = \ contact name \ type VARCHAR2 (64)	MSO_Contact Company_Contact

	contact_phone	= \ contact phone number \ type VARCHAR2 (16)	MSO_Contact Company_Contact
5	day	= \ day of week code \ type CHAR range { 'N'   'M'   'T'   'W'   'H'   'F'   'S' }	Day Channel_Map Channel_Map_PPV
10	day_description	= \ day of week description \ type VARCHAR2 (32) range { 'Sunday'   'Monday'   'Tuesday'   'Wednesday'   'Thursday'   'Friday'   'Saturday' }	Day
15	daylight_savings_time	= \ daylight savings time indicator \ type NUMBER (5, 0) [BOOLEAN] range { YES   NO }	Headend
20	do_textfit	= \ perform textfit on associated text \ type NUMBER (5, 0)	Platform Field_Type
25	end_time	= \ station channel broadcast end time \ type DATE	Channel_Map
30	event_datetime	= \ EST timestamp of broadcast event \ type DATE	Schedule Schedule_Text
35	event_price	= \ broadcast event cost to viewer \ type NUMBER (7, 2) range { 0.00 ... 99,999.99 }	Schedule Channel_Map_PPV
40	field_description	= \ field type description \ type VARCHAR2 (32) 1 TVG title 2 Ext title 3 Alt1 title 4 Grid title 5 Short copy 6 Long copy 7 Promo copy 8 Originator 9 Guideline	Field_Type
45		100 101	TVG title 30 min. TVG title 60 min.

	102	TVG title 90 min.	
	103	TVG title 120 min.	
	200	Ext title 30 min.	
	201	Ext title 60 min.	
5	202	Ext title 90 min.	
	203	Ext title 120 min.	
	<b>field_lines</b>	= \ number of screen field lines \ type NUMBER (2, 0) range { 1 ... 99 }	<b>Platform_Field</b>
10	<b>field_source_type</b>	= \ source of a text fitted value \ type NUMBER (3,0)	<b>Platform_Field</b> <b>Platform_Value</b>
15	<b>field_type</b>	= \ type of named field on platform \ type NUMBER (3, 0) Platform_Field Program_Map Schedule_Text	<b>Field_Type</b> <b>Platform_Value</b>
20	<b>font_type</b>	= \ type of font used on platform\ type NUMBER (4, 0)	<b>Font_Type</b>
	<b>Character_Pair_Kerning</b>	range { 1 ... 9,999 }	<b>Platform_Field</b>
25	<b>group_description</b>	= \ physical headend group identifier \ type VARCHAR2 (128)	<b>Groups</b>
30	<b>group_id</b>	= \ logical system group identifier \ type NUMBER (8, 0) range { 1 ... 99,999,999 } unique	<b>Groups</b> <b>Groups_System</b>
35	<b>guideline_weight</b>	= \ TV Guide recommendation level \ type NUMBER (2, 0) range { 0 ... 4 }	<b>Schedule</b>
40	<b>headend_id</b>	= \ target headend identifier \ type VARCHAR2 (32) unique	<b>Headend</b> <b>System_Headend</b> <b>Map_Time</b>
	<b>instance_end_datetime</b> = scheduled event \ Instance_Time type DATE	\ end date/time of	
45	<b>instance_start_datetime</b> = scheduled event \ Instance_Time type DATE	\ start date/time of	

	<b>kerning_value</b>	= \ kerning space value (pixels) \	
	<b>Character_Pair_Kerning</b>	type NUMBER ( 2, 0 )	
		range { 1 ... 99 }	
5	<b>last_verify_time</b>	= \ last verification date and time \	<b>Log_Control</b>
		type DATE	
	<b>left_char</b>	= \ left character of kerning pair \	
10	<b>Character_Pair_Kerning</b>	type NUMBER ( 3, 0 )	
		range { 0 ... 255 }	
	<b>live_indicator</b>	= \ program broadcast state (live/taped) \Program	
15		type NUMBER ( 5, 0 )	
		range { YES   NO }	
	<b>load_date</b>	= \ last load process date \	<b>Log_Control</b>
		type DATE	
20	<b>load_end_time</b>	= \ last load process end time \	<b>Log_Control</b>
		type DATE	
	<b>load_start_time</b>	= \ last load process start time \	<b>Log_Control</b>
25		type DATE	
	<b>log_file_drive</b>	= \ log file drive specification \	<b>Log_Control</b>
		type VARCHAR2 (128)	
30	<b>log_id</b>	= \ log control file identifier \	<b>Log_Control</b>
		type NUMBER ( 2, 0 )	
		range { 1 }	
		unique	
35	<b>log_file_seqno</b>	= \ last log file sequence number \	<b>Log_Control</b>
		type NUMBER ( 2, 0 )	
	<b>long_station_id</b>	= \ station identifier long form \	<b>Station</b>
		type VARCHAR2 (64)	
40	<b>long_station_name</b>	= \ station name (long form) \	<b>Station</b>
		type VARCHAR (512)	
	<b>map_end_time</b>	= \ channel map block start time \	<b>Map_Time</b>
45		type DATE	
	<b>map_start_time</b>	= \ channel map block end time \	<b>Map_Time</b>
		type DATE	

	<b>map_time_id</b>	= \ channel map block designator \ type VARCHAR2 (48) unique Channel_Map_PPV	Map_Time Instance_Time Channel_Map
5	<b>mpaa_rating</b>	= \ MPAA rating character \ type CHAR range { 'N'   'G'   'P'   '3'   'R'   '7' }	MPAA_Rating Movie
10	<b>mpaa_rating_code</b>	= \ MPAA rating code \ type CHAR (10)	
15	<b>mpaa_ra_description</b>	= \ MPAA rating code description \ type VARCHAR2 (128) range { 'NR - Not Rated'   'G - General Audiences'   'PG - Parental Guidance'   'PG-13 - Parental Guidance (some material not suitable for under 13 yrs)'   'R - Restricted'   'NC-17 - No one under 17 admitted' }	MPAA_Rating
20	<b>mpaa_reason</b>	= \ MPAA rating reason description \ type VARCHAR2 ( 64)	MPAA_Reason
25	<b>Movie_MPAA_Reason</b>	range { 'adult themes'   'adult situations'   'sexual situations'   'strong language'   'violence'   'nudity'   'partial nudity' }	
30			
35	<b>mpaa_reason_code</b>	= \ MPAA rating reason code \ type CHAR range { 'T'   'A'   'S'   'L'   'V'   'N'   'P' }	MPAA_Reason
40	<b>mso_address</b>	= \ multi system owner address \ type VARCHAR2 (512)	MSO
45	<b>mso_id</b>	= \ multi system owner identifier\ type NUMBER (8, 0) range { 1 ... 99,999,999 }	MSO MSO_Contact MSO_Company
	<b>mso_logo</b>	= \ multi system owner logo \ type VARCHAR2 (512)	MSO

	mso_name	= \ multi system owner description \ type VARCHAR2 (512)	MSO
5	mso_owner	= \ multi system owner name \ type VARCHAR2 (128)	MSO
10	onscreen_text_id	= \ TV Guide on screen name \ type NUMBER Text_Catalog (text_id)	Edited_Station Platform_Station
15	original_air_date	= \ YCTV event first broadcast \ type DATE range { SYSTEM_MIN_DATE ... SYSTEM_MAX_DATE }	Schedule
20	pin	= \ TV Guide program identifier \ type CHAR (20) format pppppppp.ssssssss.XX where ( XX is MV = movie   SR = series   MS = miscellaneous   SM = series master (for lock-out)   UN = unknown (is not assigned ) )	Program
25	pixel_map	= \ character pixel set identifier \ type NUMBER (2, 0) range { 1 ... 99 }	Valid_Pixel_Map Font_Type Pixel_Map
30	pixel_width	= \ width of character (pixels) \ type NUMBER (2, 0) range { 1 ... 99 }	Pixel_Map
35	pixels_field_width	= \ width of platform field (pixels) \ type NUMBER (4, 0) range { 1 ... 9,999 }	Platform_Field
40	platform_text_id	= \ platform field text catalog id \ type NUMBER Text_Catalog (text_id)	Platform_Value Schedule_Text
45	platform_id	= \ target display unit platform \ type VARCHAR2 (16) range { 'Catalyst Visual'   'ESP 8600x'   'ESP SA Grid'   'ESP Turbo'   'Starnet Passive' }	Platform Platform_Field Platform_Station Platform_Value Edited_Station System

	preview_end_offset = \ PPV preview window end time offset \Schedule	Channel_Map_PPV
5	preview_start_offset = \ window start time offset \type DATE	\ PPV preview Schedule Channel_Map_PPV
10	print_run_time = \ actual broadcast event run time \type NUMBER (7, 0) range { 0 ... 9,999,999 } where ( 0 := continuous running time )	Schedule
15	program_id = \ program identifier \type NUMBER unique Movie_MPAA_Reason Program_Map Schedule	Program Movie Movie_Credits
20	program_text_id = \ program event field text identifier \type NUMBER Schedule_Text Text_Catalog (text_id)	Program_Map Platform_Value
25	program_type = \ type of broadcast event \type VARCHAR2 (8) range { 'Other'   'PPV'   'YCTV'   'NVOD' }	Program_Type Schedule
30	purchase_call_phone = \ PPV purchase call phone number \type VARCHAR2 (16)	Schedule Channel_Map_PPV
35	purchase_end_offset = \ PPV purchase window end time offset \Schedule	Channel_Map_PPV
40	purchase_start_offset = \ PPV purchase window start time offset \Schedule	Channel_Map_PPV
45	right_char = \ right character of kerning pair \Character_Pair_Kerning	
	type NUMBER (3, 0) range { 0 ... 255 }	
	role_name = \ alias actor name \type VARCHAR2 (64)	Movie_Credit

	<b>searchtype</b>	= \ word search type - whole word or not \Wordlist type NUMBER (2, 0) ? range { 0   1 }	
5	<b>series_id</b>	= \ program series identifier \ Schedule type NUMBER (7, 0) range { 1 ... 9,999,999 }	
10	<b>seqno</b>	= \ sequence number to maintain order \Day type NUMBER (2, 0)	
	<b>Movie_MPAA_Reason</b>	range { 1 ... 99 }	
15	<b>slot_run_time</b>	= \ broadcast event run time (minutes) \ Schedule type NUMBER (7, 0) range { 0 ... 9,999,999 } where ( 0 := continuous running time )	
20	<b>star_rating</b>	= \ TV Guide movie quality rating \ Movie type NUMBER (2, 0) range { 0 ... 5 }	
	<b>start_time</b>	= \ broadcast station channel start time \Channel_Map type DATE	Channel_Map_PPV
25	<b>station_description</b>	= \ station type description \ Station_Type type VARCHAR2 (32) range { 'Broadcast'   'Cable'   'Premium'   'Select Entertainment'   'PPV'   'Hits at Home'   'YCTV' }	
30			
35	<b>station_id</b>	= \ broadcast station call letters \ type VARCHAR2 (16) unique Platform_Station Schedule Channel_Map Channel_Map_PPV Schedule_Text	Station Edited_Station Instance_Time
40			
45	<b>station_priority</b>	= \ schedule conflict resolution priority \ type NUMBER (2, 0) range ( 1 ... 5 )	Channel_Map Instance_Time Channel_Map_PPV

	station_type	= \ type of station class \ type NUMBER (2, 0) \ range { 10 ... 99 }	Station_Type Station
5	system_description	= \ system description \ type VARCHAR2 (64)	System
10	system_id	= \ system identifier \ type NUMBER (8, 0) \ range { 1 ... 99,999,999 } \ unique	System Groups_System System_Headend
15	text	= \ catalog text character string \ type VARCHAR2 (512)	Text_Catalog
20	text_id	= \ catalog text identifier \ type NUMBER	Text_Catalog
25	timezone	= \ broadcast event time zone \ type CHAR (3) \ range {'ET'   'CT'   'MT'   'PT'   'AT'   'HAT'   'LT'   'ST' }	Timezone Headend
30	touched	= \ text last touched timestamp \ type DATE	Text_Catalog
35	tz_description	= \ timezone description \ type VARCHAR2 (64)	Timezone
40	word	= \ proscribed work \ type VARCHAR2 (50) \ unique	Wordlist
45	year	= \ movie release year \ type NUMBER (4, 0) \ range { 0 ... 9,999 }	Movie

Table 2

Table	Attribute/Primary Key	Foreign Key Table
Barker_Type		

22

5           pk     = barker\_type

          barker\_type  
          barker\_description

5

### Cable\_Company

10           pk     = company\_id

          company\_id  
          company\_name  
          company\_owner  
          company\_address  
          company\_logo

15

### Category

20           pk     = category

          category

### Channel\_Map

25           pk     = map\_time\_id  
          + channel\_number  
          + channel\_label  
          + station\_priority  
          + day  
          + start\_time

30

          map\_time\_id                                   Map\_Time  
          channel\_number  
          channel\_label  
          station\_priority  
          day   Day  
          start\_time  
          end\_time  
          station\_id                                   Station  
          barker\_type                                   Barker\_Type

40

### Channel\_Map\_PPV

45           pk     = map\_time\_id  
          + channel\_number  
          + channel\_label  
          + station\_priority  
          + day  
          + start\_time

23

	map_time_id	Map_Time
	channel_number	
	channel_label	
	station_priority	
5	day	Day
	start_time	
	purchase_start_offset	
	purchase_end_offset	
10	purchase_call_phone	
	preview_start_offset	
	preview_end_offset	
	event_price	

**Character\_Pair\_Kerning**

15	pk	= font_type + left_char + right_char
20	font_type	Font_Type
	left_char	
	right_char	
	kerning_value	

**25 Color\_Class**

	pk	= color_class
		color_class

30	Company_Contact	
	pk	= company_id + contact_name
35	company_id	Cable_Company
	contact_name	
	contact_phone	
	contact_fax	
40	contact_email	

**Day**

45	pk	= day
	day	
	day_description	
	seqno	

## **Edited Station**

pk = platform\_id  
+ station\_id

5

platform\_id  
station\_id  
onscreen\_text\_id

Platform  
Station  
Text\_Catalog (text\_id)

## 10 Field Type

pk = field type

15 field\_type  
field\_description  
do\_textfit

### Font\_Type

20 pk = font type

font\_type  
pixel\_map

### Valid\_Pixel\_Map

## 25 Groups

pk = group\_id

30 **group\_id**  
**group\_description**

## **Groups    System**

35                   pk    = group\_id  
                      + system\_id

group\_id  
system\_id

## Groups System

## 40 Headend

pk = headend\_id

45 headend\_id  
timezone  
daylight\_savings\_time

## Timezone

### Instance Time

25

pk = map\_time\_id  
+ channel\_number  
+ channel\_label  
+ station\_priority  
+ instance\_start\_datetime  
5  
map\_time\_id Map\_Time  
channel\_number  
channel\_label  
station\_priority  
10  
instance\_start\_datetime  
instance\_end\_datetime  
station\_id Station  
barker\_type Barker\_Type  
15

**Log\_Control**

pk = log\_id  
20  
log\_id  
load\_date  
load\_start\_time  
load\_end\_time  
last\_verify\_time  
25  
log\_file\_seqno  
log\_file\_drive

**Map\_Time**

30 pk = map\_time\_id  
map\_time\_id  
headend\_id Headend  
map\_start\_time  
map\_end\_time  
35

**Movie**

40 pk = program\_id  
program\_id Program  
mpaa\_rating MPAA\_Rating  
year  
star\_rating  
45

**Movie\_Credits**

pk = program\_id

26

+ billing

	program_id	Movie
5	billing	
	actor_name	
	role_name	
<b>Movie_MPAA_Reason</b>		
10	pk = program_id	
	+ mpaa_reason	
	program_id	Movie
15	mpaa_reason	MPAA_Reason
	seqno	
<b>MPAA_Rating</b>		
20	pk = mpaa_rating	
	mpaa_rating	
	mpaa_rating_code	
	mpaa_ra_description	
25	<b>MPAA_Reason</b>	
	pk = mpaa_reason	
30	mpaa_reason	
	mpaa_reason_code	
<b>MSO</b>		
35	pk = mso_id	
	mso_id	
	mso_name	
	mso_owner	
	mso_address	
40	mso_logo	
<b>MSO_Company</b>		
45	pk = mso_id	
	+ company_id	
	mso_id	MSO
	company_id	Cable_Company

**MSO\_Contact**

5	<b>pk</b> = mso_id + contact_name	
	mso_id	MSO
	contact_name	
	contact_phone	
	contact_fax	
10	contact_email	

**Pixel\_Map**

15	<b>pk</b> = pixel_map + character	
	pixel_map	Valid_Pixel_Map
	character	
	pixel_width	

20 **Platform**

25	<b>pk</b> = platform_id	
	platform_id	
	do_textfit	

**Platform\_Field**

30	<b>pk</b> = platform_id + field_type	
	platform_id	Platform
	field_type	Field_Type
35	characters_field_width	
	pixels_field_width	
	field_lines	
	field_source_type	Field_Type (field_type)
	font_type	Font_Type

40 **Platform\_Station**

45	<b>pk</b> = platform_id + station_id	
	platform_id	Platform
	station_id	Station
	onscreen_text_id	Text_Catalog (text_id)

**Platform\_Value**

5	$  \begin{aligned}  \text{pk} &= \text{platform\_id} \\  &+ \text{field\_type} \\  &+ \text{program\_text\_id}  \end{aligned}  $	
10	$  \begin{aligned}  &\text{platform\_id} \\  &\text{field\_type} \\  &\text{program\_text\_id} \\  &\text{platform\_text\_id} \\  &\text{field\_source\_type}  \end{aligned}  $	<b>Platform</b> <b>Field_Type</b> <b>Text_Catalog (text_id)</b> <b>Text_Catalog (text_id)</b> <b>Field_Type (field_type)</b>

**Program**

15	$  \begin{aligned}  \text{pk} &= \text{program\_id}  \end{aligned}  $	
20	$  \begin{aligned}  &\text{program\_id} \\  &\text{pin} \\  &\text{live\_indicator} \\  &\text{category}  \end{aligned}  $	<b>Category</b>

**Program\_Map**

25	$  \begin{aligned}  \text{pk} &= \text{program\_id} \\  &+ \text{field\_type}  \end{aligned}  $	
30	$  \begin{aligned}  &\text{program\_id} \\  &\text{field\_type} \\  &\text{program\_text\_id}  \end{aligned}  $	<b>Program</b> <b>Field_Type</b> <b>Text_Catalog (text_id)</b>

**Program\_Type**

35	$  \begin{aligned}  \text{pk} &= \text{program\_type}  \end{aligned}  $	
	$  \begin{aligned}  &\text{program\_type}  \end{aligned}  $	

**Schedule**

40	$  \begin{aligned}  \text{pk} &= \text{station\_id} \\  &+ \text{event\_datetime}  \end{aligned}  $	
45	$  \begin{aligned}  &\text{station\_id} \\  &\text{event\_datetime} \\  &\text{series\_id} \\  &\text{program\_id} \\  &\text{closed\_caption} \\  &\text{color\_class} \\  &\text{slot\_run\_time}  \end{aligned}  $	<b>Station</b> <b>Program</b> <b>Color_Class</b>

	print_run_time	
	event_price	
	purchase_start_offset	
	purchase_end_offset	
5	purchase_call_phone	
	preview_start_offset	
	preview_end_offset	
	original_air_date	
	available_until	
10	guideline_weight	
	program_type	Program_Type

### Schedule\_Text

15	pk = station_id	
	+ event_datetime	
	+ field_type	
20	station_id	Station
	event_datetime	
	field_type	Field_Type
	program_text_id	Text_Catalog (text_id)
25	fk = station_id	Schedule
	+ event_datetime	

### Station

30	pk = station_id	
	station_id	
	station_type	Station_Type
	long_station_name	

### 35 Station\_Type

	pk = station_type	
40	station_type	
	station_description	

### System

45	pk = system_id	
	system_id	
	system_description	
	platform_id	Platform

**System\_Headend**

5	pk = system_id + headend_id	
	system_id	System
	headend_id	Headend

**Text\_Catalog**

10	pk = text_id	
	text_id	
	text	
15	touched	

**Timezone**

20	pk = timezone	
	timezone	
	tz_description	

**Valid\_Pixel\_Map**

25	pk = pixel_map	
	pixel_map	

**Wordlist**

30	pk = word	
	word	
35	searchtype	

**Missing Stations**

As shown in Fig. 2, in order to check for missing stations, the user must 40 designate a station list file. The station list file may contain every station in the database, a subset of stations representing the stations in a particular cable system, any user defined group of stations, or a single station. In addition, the station list file contains a data field for each station indicating the daily on-air times for that station. The listings database (i.e., the station\_id field) is then searched against this file to

determine if each station in the station list file is included in the database. If missing stations are found, the total number of missing stations is incremented and displayed and the name of the missing station is written to an output file.

#### Schedule Gaps and Overlaps

5 The schedule gap and overlap option operates as shown in Fig. 3. The flow chart shows the operation for a single station but operation is the same for each station in a station list file. First, a time range is selected for checking for gaps and overlaps. The system then checks the database to determine if the beginning of the time range coincides with the start of a program and begins the process with this  
10 listing. If the beginning of the time range intersects a program already showing, the system begins the process with this listing. The start time (start\_time) for the first listing to be checked is then retrieved from the database. If there are no gaps or overlaps in the schedule, the start time of the next listing should be the start time of the previous listing plus the slot run time (slot\_run\_time) of the previous listing. Each  
15 listing is then checked in succession according to the following equations used to determine whether there is a hole or a gap:

$$T_{n+1} = T_n + RT_n \text{ (schedule is correct)}$$

$$T_{n+1} > T_n + RT_n \text{ (schedule gap)}$$

$$T_{n+1} < T_n + RT_n \text{ (schedule overlap)}$$

20 where  $T_n$  represents the start time and  $RT_n$  the slot run time for the nth listing in the database. Each entry in the database is checked independently of the other entries so that a schedule gap or overlap for a particular pair of programs will not affect all of the subsequent listings in the database. For stations that do not broadcast 24 hours a day, an off-the-air place holder is inserted into the database and treated as a program.

25 For some television stations, particularly premium stations, a small gap or overlap (i.e., 5 minutes) in programs may be permitted. For example, on a premium movie channel, a movie may begin 5 minutes or so after the slot time so that if the previous movie runs 3 minutes into the slot time, there is no actual overlap. Similarly, a movie with a running time of, e.g., 87 minutes will end prior to the  
30 beginning of the next time slot. However, it is common for premium stations to fill this apparent gap with advertising or other promotional material. If this is the case, the

equations may be modified as follows to reflect the fact that such small gaps and overlaps are permissible:

$$T_{n+1} = (T_n + RT_n) +/- 5 \text{ minutes (schedule is correct)}$$

$$T_{n+1} > T_n + RT_n + 5 \text{ minutes (schedule gap)}$$

5  $T_{n+1} < T_n + RT_n - 5 \text{ minutes (schedule overlap)}$

#### Missing Titles, Copy, Fields, and Movie Ratings

The missing titles, missing copy, missing fields, and missing movie ratings utilities operate as follows. For each of these options, the listings are checked  
10 for the missing information by searching the designated field or fields. For missing titles, all of the different titles for a program may be checked, including the full (TVG) title and the various shortened versions (i.e., for 30, 60, 90, and 120 minute grid boxes). For the missing copy option, the long copy, short copy, and promo copy fields may be checked. In the database described by Tables 1 and 2, all textual data  
15 (including program titles, copy, and originator) for a program is stored in a Text\_Catalog table, which is indexed using a text\_id. The text\_id is obtained from another table, such as Program\_Map, which consists of an array of pointers into the Text\_Catalog. The Program\_Map table is indexed using the program\_id and field\_type. There is a text pointer for each of the different field types as indicated  
20 under the field\_description in Table 1. Using a program\_id, all text data associated with a program may be retrieved.

For the missing movie rating option, the MPAA\_rating field is checked. For the missing fields option, all fields which should be present for a particular listing (according to the operating rules of the EPG) are checked. When any of the above  
25 missing fields is found, the appropriate count is incremented and displayed. In addition, the date, start time, station identification, and title (for missing copy and MPAA ratings) are written to the appropriate output verification report.

The missing copy option will check for missing copy for all the listings that should include copy such as movies, live sports, and pay-per-view programs. The  
30 missing movie ratings option checks all premium channels and pay-per-view events for movie ratings since only these channels will air un-edited movies. It is of course also possible to generate a single output verification report including all of the listings with

missing information. Thus, a single file can be generated listing all listings with missing titles, copy, and/or movie ratings.

#### Lengthy Titles and Lengthy Copy

The operation of the lengthy titles and lengthy copy options is as follows. Based on the platform or platforms selected by the user (the Platform\_id field), the system checks a table in the database that indicates the various different display formats for each listing. For example, if the platform supports both an interactive and channel guide type EPG, each with different display characteristics, the table will indicate that each should be included in the database. Thus, for a two hour movie, the system will check that there are titles for each listing tagged as 30, 60, 90, and 120 minute listings to fit into the different sized grid cells for each of the two types of EPGs. If any of the required titles are missing, the system will write sufficient information to the output report to identify the missing title. In addition, the system checks the multiple versions of the titles in the database to ensure that each fits into the designated space for the particular platform. The space required for display of the listings is determined by consulting the table listing the available fonts for the platform and calculating the space required based on the font and character pair kerning. The character\_pair\_kerning table shown in Table 2 returns the kerning value for character pairs that are kerned which is used to determine the actual space required for display of a character pair. In order to avoid calculating the space required for display of an entire word each time the word is encountered in the database, a look-up table may be built including, for each different font, the space required for display of a word, accounting for character pair kerning. In this manner, the look up table is consulted prior to actually calculating the required space. If the word is in the look-up table, it is not necessary to calculate the space requirement. If it is not, following calculation of the space requirement, the word is added to the look-up table for future reference. Alternatively, in order to avoid recalculation of whether any particular title will fit in a particular display for a particular platform, an appropriate tag is applied to each title that previously has been text-fitted. Then, when the verification process is run, in order to determine if all text-fitted titles are present, the system checks for the presence of titles previously tagged for the specific platform.

For lengthy copy, each listing which, according to the operating rules of the EPG, should include copy, is checked. Based on the platform chosen, the system consults a table in the database that indicates the space available for copy. Lengthy copy is then checked in the same manner as lengthy titles. If the space 5 required for display of the title or copy exceeds the available space, the count is incremented and displayed and the platform, date, start time, station identification and lengthy title or copy are written to the appropriate verification report.

#### Editorial Errors

10 The above options check for fields that are completely missing data and fields that include data that exceeds the designated space in which it must fit. They do not, however, detect errors in the data itself. The editorial errors option supplements these options by checking for particular errors in the data fields. This option searches the listings for the more common types of errors found in the database. These include 15 duplicated movie titles and years, cross references to other days of the programming week (for programs repeating each day), and the phrase "at press time" (often used where at the time the database is compiled certain information about a program is not yet known). For each such editorial error located, the count is incremented and displayed, and the date, time, station identification, and type of error are written to the 20 output verification file.

The above editorial errors are only a few of the errors that may occur in the database. If additional types of errors are detected, these may also be checked by the editorial error option.

25

#### Inappropriate Language

The inappropriate language option is similar to the editorial errors option in that it checks the listings database for certain words and phrases that are not appropriate for an EPG. All such words and phrases are included in the language dictionary file. The database is then checked for any character strings matching these 30 words and phrases. If any matches are found, the count is incremented by one and displayed and the date, start time, station identification, and inappropriate language found are written to the output file. The inappropriate language utility may be

configured to check each database field containing textual data. Alternatively, only certain text fields may be designated for checking against the inappropriate language file.

#### Other Verification Options

5 Operation of the other verification options is similar to that of the options enumerated above. Missing program type, slot time, run time, program origin, PPV price and PPV promotional copy may be implemented in the same manner as the other missing field options. The PPV event on a non-PPV station and non-PPV event on a PPV station options are implemented by comparing the program\_type and  
10 station\_type fields for a program.

#### System Implementation

It will be recognized by those of skill in the art that the system may be implemented on any of a number of digital computers. In one embodiment, a 486 based personal computer system may be used. Alternatively, due to the large amount  
15 of data to be processed, a more powerful workstation computer may be used. A mass storage device, such as an optical disc, hard drive, or magnetic tape is used to store the database. The data verification utility may be resident on the computer which includes a display device and keyboard for entry of user commands. In one embodiment, the utility is implemented in a Microsoft Windows environment for  
20 maximum user friendliness. Fig. 4. shows a verification set-up screen for selecting the various verification options. In the top portion of the screen 10, the user selects whether to run verification on a group of cable systems, a single cable system, or a single head end. Also in the top portion of screen 10, the user selects the starting and ending times on which the data verification is run. In the lower portion of the screen  
25 20, the various verification options are selected. Alternatively, all tests may be selected using a single button. After verification is run, the user is presented with correction menu 30 shown in Fig. 5. The correction menu permits the user to correct the errors by type of error. Upon selecting an error type for correction, the user is presented with the correction editor screen shown in Fig. 6. The correction editor  
30 screen displays the values of the different fields for the program listing containing an error so that the user may make the appropriate changes.

Once the data is processed by the data verification utility and the additions, changes, and edits are made to the listings database, the data for a particular cable system is extracted and prepared for transmission to the cable system. At this stage, the data corresponding to a particular channel map is extracted from the database 5 and converted to ASCII format or a binary data format readable by the cable system. The data file may be transmitted to the cable system by any of a number of means such as by satellite, telephone line, portable storage medium, or broadcast.

In an alternate embodiment, the data verification utility may be resident at each of the cable system head-ends. In this manner, the cable system's individual 10 data file is extracted from the program listings database and transmitted to the cable system. The various checking options associated with the utility may then be run at the cable system head end prior to transmission of the EPG data to individual viewers. Thus, only the data for stations carried by the particular cable system is checked. The advantage of this arrangement is that it provides for listings editing capabilities at each 15 cable system so that errors not detected by the EPG provider may be corrected and last minute changes reflected in the data provided to the viewers.

The code for a particular computer program to implement the invention disclosed herein will be readily apparent to those skilled in the art of video system programming and graphic display based on the description contained herein and 20 associated figures. It will also be appreciated by those skilled in the art that there can be departure from the specific embodiment of the invention described herein without departing from the true scope of the claims appended hereto.

We claim:

1. A data verification system for an electronic television program guide comprising:

storage means for storing a database of television program schedule listings,  
5 data processing means for analyzing said database for at least one of schedule gaps and schedule overlaps,  
editing means for editing said database,  
and transmission means for transmitting said edited database to a plurality of remote locations.

10 2. The system of claim 1 wherein said data processing means further analyzes said database for missing stations.

3. The system of claim 1 wherein said data processing means further analyzes said database for at least one of missing titles, copy, and fields.

15 4. The system of claim 1 wherein said data processing means further analyzes said database for at least one of lengthy titles and lengthy copy.

5. The system of claim 1 wherein said data processing means further analyzes said database for editorial errors.

6. The system of claim 1 wherein said data processing means further analyzes said database for inappropriate language.

20 7. The system of claim 1 wherein said transmission means transmits said database to a plurality of cable systems.

8. The system of claim 1 wherein said transmission means transmits said database to a plurality of television viewers.

25 9. The system of claim 1 wherein said database comprises schedule times and run times for a plurality of television programs and said data processing means determines if either of the following inequalities is substantially met:

$$T_{n+1} > T_n + RT_n$$

$$T_{n+1} < T_n + RT_n$$

30 where  $T_n$  denotes the schedule time and  $RT_n$  the run time for the  $n$ th listing in the database, and  $T_{n+1}$  denotes the schedule time for the  $n+1$ th listing in the database.

10. A data verification system for an electronic television program guide comprising:

storage means for storing a database of television program schedule listings, said database comprising program schedule listings for a plurality of television stations, data processing means for analyzing said database for missing stations, editing means for editing said database, 5 and transmission means for transmitting said edited database to a plurality of remote locations.

11. The system of claim 10 wherein said data processing means further analyzes said database for at least one of missing titles, copy, and fields.

12. The system of claim 10 wherein said data processing means 10 further analyzes said database for at least one of lengthy titles and lengthy copy.

13. The system of claim 10 wherein said data processing means further analyzes said database for editorial errors.

14. The system of claim 10 wherein said data processing means further analyzes said database for inappropriate language.

15. 15. A data verification system for an electronic television program guide comprising:

storage means for storing a database of television program schedule listings, said database comprising program titles for a plurality of television programs,

data processing means for analyzing said database for missing titles,

20 editing means for editing said database,

and transmission means for transmitting said edited database to a plurality of remote locations.

16. The system of claim 15 wherein said data processing means further analyzes said database for at least one of schedule gaps and schedule holes.

25 17. The system of claim 15 wherein said data processing means further analyzes said database for missing stations.

18. The system of claim 15 wherein said data processing means further analyzes said database for editorial errors.

19. The system of claim 1 wherein said data processing means lists 30 the start time and end time of said schedule gaps and/or overlaps.

20. The system of claim 10 wherein said data processing means lists the missing stations.

21. In an electronic program guide system for television programs, a system for verifying the data contained in a database of television program schedule information comprising:

5 storage means for storing a database of television program schedule information, a data processor for locating gaps in said program schedule information, and a display device for displaying information identifying said gaps.

22. The system of claim 21 wherein said data processor locates schedule overlaps in said database and said display device displays information identifying said schedule overlaps.

10 23. The system of claim 21 wherein said data processor identifies missing stations in said database and said display device displays said missing stations.

24. The system of claim 21 wherein said data processor locates missing titles in said database and said display device displays information identifying the locations of said missing titles.

15 25. The system of claim 21 wherein said data processor locates missing fields in said database and said display device displays information identifying the locations of said missing fields.

20 26. In an electronic program guide system for television programs, a system for verifying the data contained in a database of television program schedule information comprising:

storage means for storing a database of television program schedule information, a data processor for identifying missing stations in said program schedule information, and a display device for displaying said missing stations.

25 27. The system of claim 26 wherein said data processor locates missing titles in said database and said display device displays information identifying the locations of said missing titles.

30 28. The system of claim 26 wherein said data processor locates missing fields in said database and said display device displays information identifying the locations of said missing fields.

29. The system of claim 21 further comprising means for transmitting said database to a plurality of remote locations.

30. The system of claim 29 wherein said plurality of remote locations comprise cable systems.

31. A process for verifying the data in an electronic television program guide comprising:

5 providing a database of television program listings data to a data processor, said database comprising program titles, program start times, and program run times, analyzing said database for at least one of schedule gaps and schedule overlaps, listing said schedule gaps and/or schedule overlaps, and editing said database to correct said gaps and/or overlaps.

10 32. The process of claim 31 wherein said database is further analyzed for missing stations.

33. The process of claim 31 wherein said data processor further analyzes said database for at least one of missing titles, copy, and fields.

15 34. The process of claim 31 wherein said data processor further analyzes said database for at least one of lengthy titles and lengthy copy.

35. The process of claim 31 wherein said data processor further analyzes said database for editorial errors.

36. The process of claim 31 wherein said data processor further analyzes said database for inappropriate language.

20 37. The process of claim 31 further comprising transmitting said database to a plurality of cable systems.

38. The process of claim 31 further comprising transmitting said database to a plurality of television viewers.

25 39. The process of claim 31 wherein said database comprises schedule times and run times for a plurality of television programs and said data processor determines if either of the following inequalities is substantially met:

$$T_{n+1} > T_n + RT_n$$

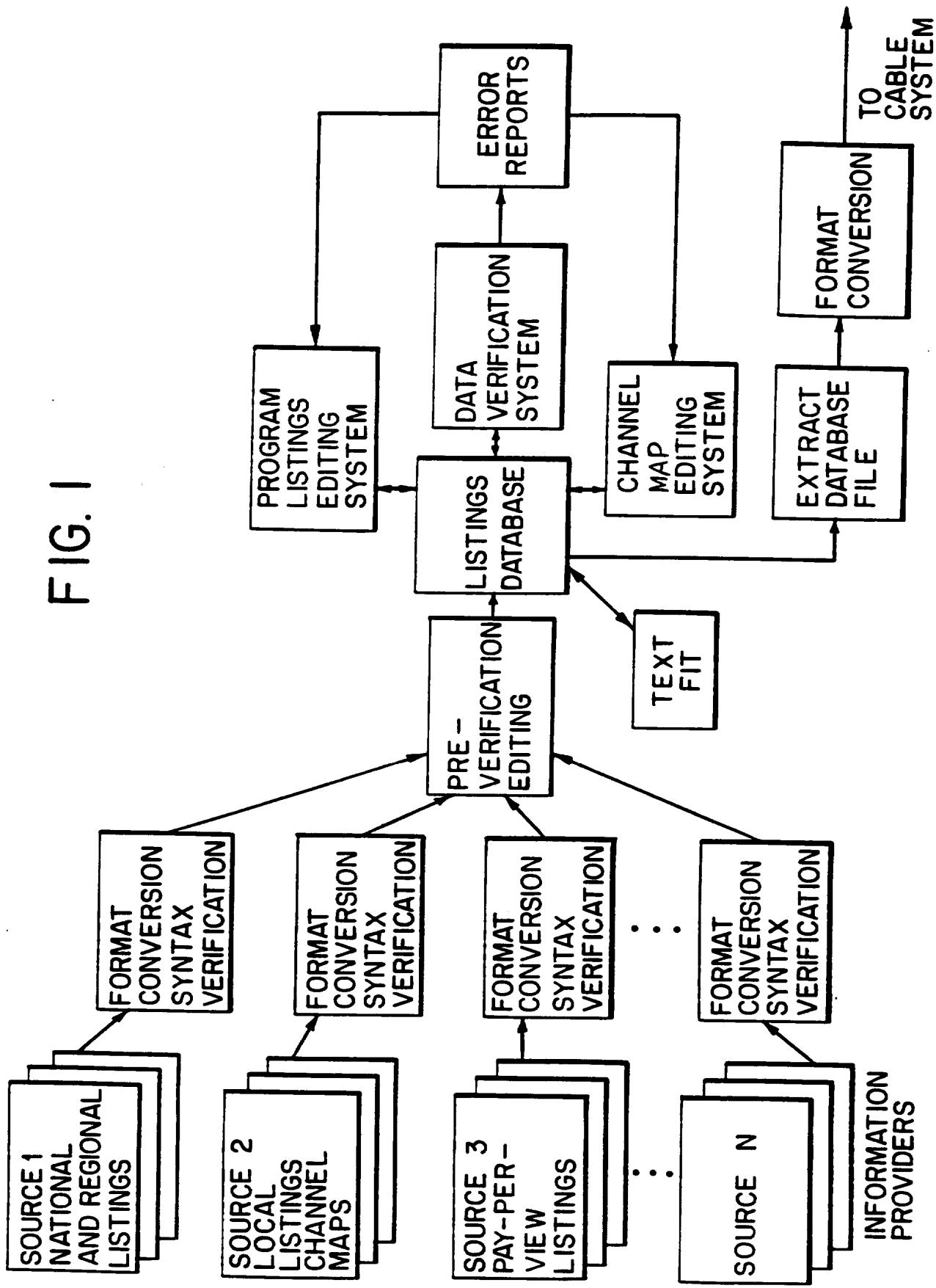
$$T_{n+1} < T_n + RT_n$$

30 where  $T_n$  denotes the schedule time and  $RT_n$  the run time for the  $n$ th listing in the database, and  $T_{n+1}$  denotes the schedule time for the  $n+1$ th listing in the database.

40. A process for delivering an electronic television program guide to a plurality of remote locations comprising:

receiving television program listings from a plurality of information providers,  
formatting said program listings,  
providing said formatted program listings to a database of program schedule  
information,  
5       analyzing said formatted listings to locate missing stations, missing titles,  
schedule gaps, and schedule overlaps,  
      storing information identifying said located missing stations, missing titles,  
schedule gaps, and schedule overlaps,  
      editing said formatted program listings in response to said stored information,  
10      extracting a portion of said formatted and edited program listings from said  
database,  
      and transmitting said extracted portion to a remote location.

FIG. 1



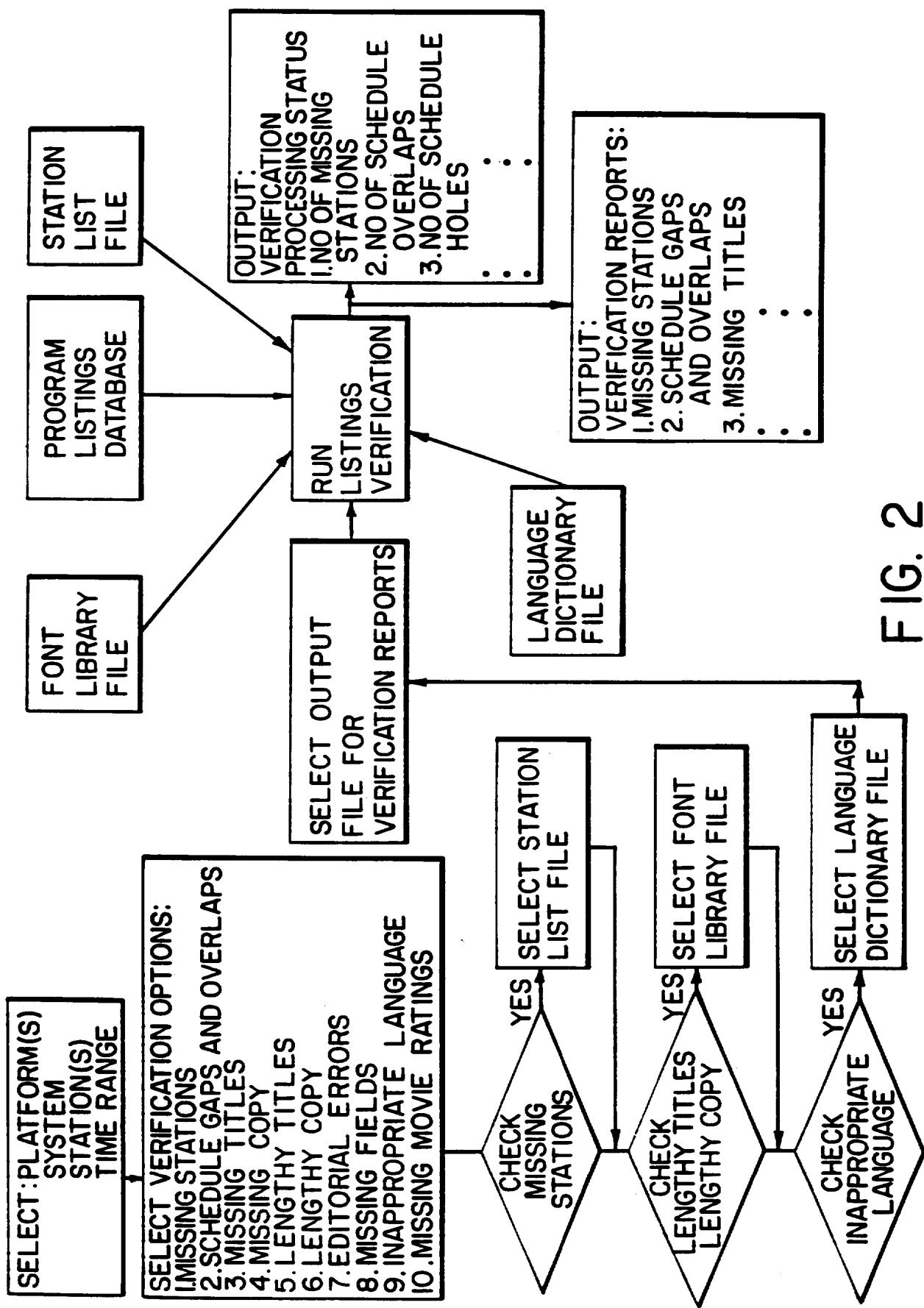


FIG. 2

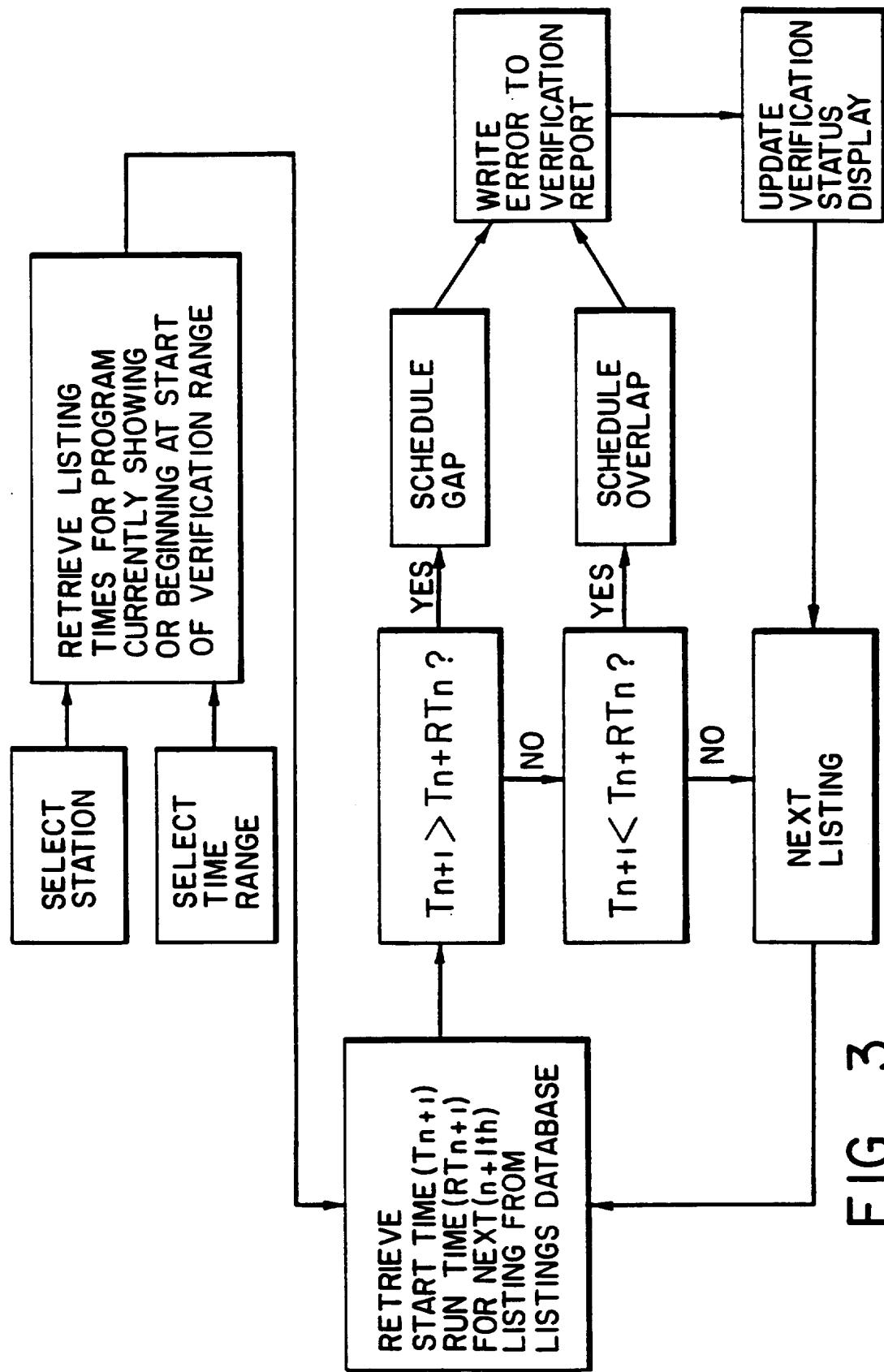


FIG. 3

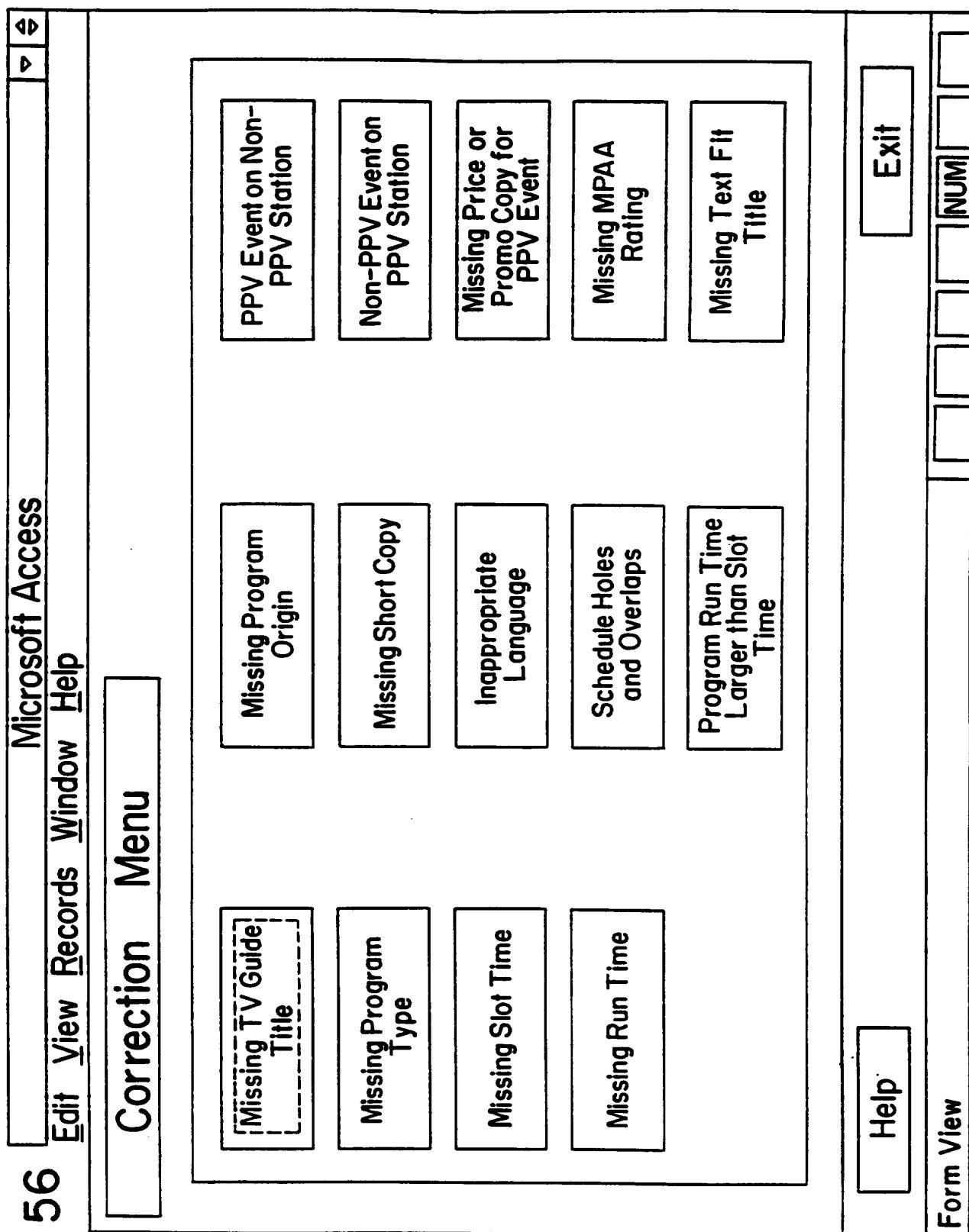
 Microsoft Access	
<b>5.3</b> <a href="#">Edit</a> <a href="#">View</a> <a href="#">Records</a> <a href="#">Window</a> <a href="#">Help</a>	
<b>Verification</b>	
<input type="button" value="Verify By..."/>	
<input type="radio"/> <b>Group</b>	
<input type="radio"/> System	
<input type="radio"/> Headend	
Group / System / Headend: <input type="text" value="&lt;=&gt;"/>	
Starting: <input type="text"/> Day: <input type="text"/> Date: <input type="text"/> Time: <input type="text"/>	
Ending: <input type="text"/> Day: <input type="text"/> Date: <input type="text"/> Time: <input type="text"/>	
<input type="checkbox"/> Check TVG Title <input type="checkbox"/> Check Program Origin <input type="checkbox"/> Check PPV Event on Non-PPV	
<input type="checkbox"/> Check Program Type <input type="checkbox"/> Check Short Copy <input type="checkbox"/> Check Non-PPV Event on PPV	
<input type="checkbox"/> Check Slot Time <input type="checkbox"/> Check Language <input type="checkbox"/> Check PPV Event Price/Promo-Copy	
<input type="checkbox"/> Check Run Time <input type="checkbox"/> Check Schedule Holes <input type="checkbox"/> Check Premium/PPV Movies/Ratings	
<input type="checkbox"/> Check Times <input type="checkbox"/> Check Times <input type="checkbox"/> Check for Missing Text Fit Title	
<input type="button" value="Deselect All Tests"/>	
<input type="button" value="Select All Tests"/>	
<input type="button" value="Help"/>	
<input type="button" value="Verify"/>	
<input type="button" value="Exit"/>	
<input type="button" value="Form"/> <input type="button" value="View"/> <input type="button" value="NUM"/>	

5.3

10

20

FIG. 4



 Microsoft Access	
	
<b>Correction Editor</b>	
Currently Correcting: <input type="text"/>	
PIN: <input type="text"/>	Live: <input type="checkbox"/>
TVG Title: <input type="text"/>	Station: <input type="text"/>
Date/ Time: <input type="text"/>	Station Type: <input type="text"/>
Program Type: <input type="text"/>	Slot Time: <input type="text"/>
Run Time: <input type="text"/>	Program Origin: <input type="text"/>
Category: <input type="text"/>	Price: <input type="text"/>
MPAA Rating: <input type="text"/>	
Short Copy: <input type="text"/>	
Long Copy: <input type="text"/>	
Promo Copy: <input type="text"/>	
<input type="button" value="Skip"/>	
<input type="button" value="Cancel"/>	
<input type="button" value="Save"/>	
<input type="button" value="Exit"/>	
<input type="button" value="Help"/>	
<input type="button" value="Form View"/>	
<input type="button" value="NUM"/>	

40

FIG. 6

# INTERNATIONAL SEARCH REPORT

Int'l Application No  
PCT/US 95/13957

A. CLASSIFICATION OF SUBJECT MATTER  
IPC 6 H04N7/08

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)  
IPC 6 H04N G11B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	<p>CABLE TV SESSIONS, MONTREUX, JUNE 10 - 15, 1993, no. SYMP. 18, 11 June 1993 POSTES;TELEPHONES ET TELEGRAPHES SUISSES, pages 571-586, XP 000379382 BRUGLIERA V 'DIGITAL ON-SCREEN DISPLAY A NEW TECHNOLOGY FOR THE CONSUMER INTERFACE' see the whole document</p> <p>---</p> <p>-/-</p>	1, 10, 15, 21, 26, 31, 40

Further documents are listed in the continuation of box C.

Patent family members are listed in annex.

\* Special categories of cited documents :

- \*A\* document defining the general state of the art which is not considered to be of particular relevance
- \*E\* earlier document but published on or after the international filing date
- \*L\* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- \*O\* document referring to an oral disclosure, use, exhibition or other means
- \*P\* document published prior to the international filing date but later than the priority date claimed

- \*T\* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- \*X\* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- \*Y\* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
- \*&\* document member of the same patent family

Date of the actual completion of the international search

24 January 1996

Date of mailing of the international search report

- 6. 03. 96

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2  
NL - 2280 HV Rijswijk  
Tel. (+ 31-70) 340-2040, Tx. 31 651 epo nl.  
Fax (+ 31-70) 340-3016

Authorized officer

Fuchs, P

## INTERNATIONAL SEARCH REPORT

Inte	ntal Application No
PCT/US 95/13957	

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		
Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	<p>GLOBECOM '82, vol. 3/3, 29 November 1982 - 2 December 1982 MIAMI (US), pages f831-f835, RONALD D. GORDON 'AN INTELLIGENT ELECTRONIC BOOK SYSTEM AND PUBLISHING FACILITY' see abstract see page F833, paragraph 4; figure 5 see page F834, paragraph 5 ---</p>	1, 10, 15, 21, 26, 31, 40
A	<p>IBM DISCLOSURE BULLETIN, vol. 25, no. 8, - January 1983 P.S. COHEN ET AL. 'Video disk dictionary system' see the whole document -----</p>	1, 10, 15, 21, 26, 31, 40